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Industry Research Report on Fluorochemicals & Specialty Gases

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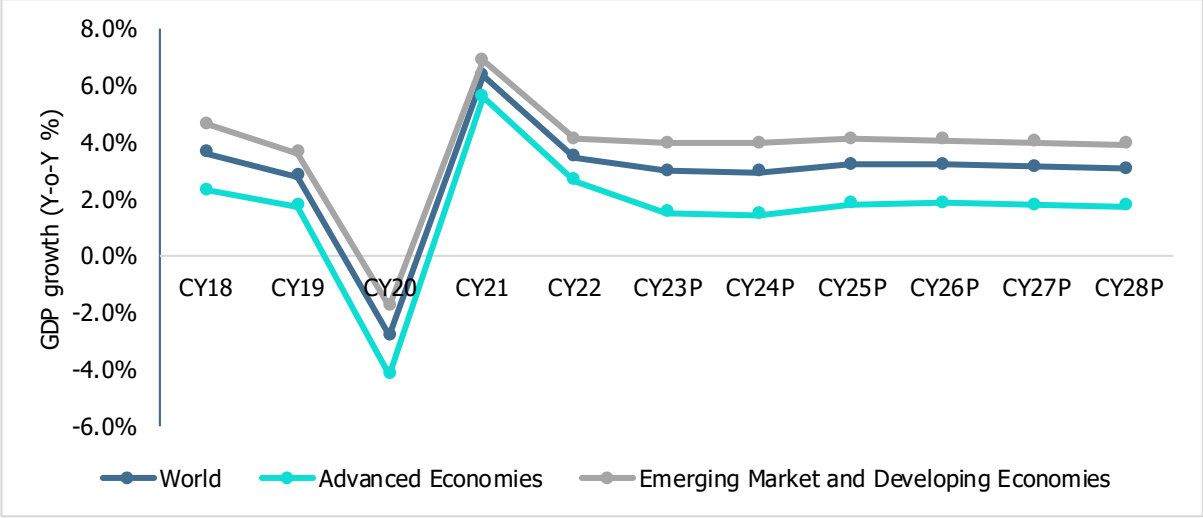
1. Economic Outlook

1.1. Global Economic Outlook

As per the International Monetary Fund (IMF)'s World Economic Outlook growth projections released in October 2023, the global economic growth for CY22[1] stood at 3.5% on a year-on-year (y-o-y) basis, down from 6.3% in CY21 due to disruptions resulting from the Russia-Ukraine conflict and higher-than-expected inflation worldwide. On the other hand, the global economic growth for CY23 is projected to slow down further to 3.0% and 2.9% in CY24, attributed to compressing global financial conditions, expectant steeper interest rate hikes by major central banks to fight inflation, and spill-over effects from the Russia-Ukraine conflict, with gas supplies from Russia to Europe expected to remain tightened. For the next 4 years, the IMF projects world economic growth in the range of 3.0%-3.2% on a y-o-y basis.

Chart 1: Global Growth Outlook Projections (Real GDP, Y-o-Y change in %)



Notes: P-Projection;
Source: IMF – World Economic Outlook, October 2023

Table 1: GDP growth trend comparison - India v/s Other Emerging and Developing Economies (Real GDP, Y-o-Y change in %)

	Real GDP (Y-o-Y change in %)									
	CY19	CY20	CY21	CY22	CY23P	CY24P	CY25P	CY26P	CY27P	CY28P
India	3.9	-5.8	9.1	7.2	6.3	6.3	6.3	6.3	6.3	6.3
China	6.0	2.2	8.5	3.0	5.0	4.2	4.1	4.1	3.7	3.4
Indonesia	5.0	-2.1	3.7	5.3	5.0	5.0	5.0	5.0	5.0	5.0
Saudi Arabia	0.8	-4.3	3.9	8.7	0.8	4.0	4.2	3.3	3.3	3.1
Brazil	1.2	-3.3	5.0	2.9	3.1	1.5	1.9	1.9	2.0	2.0

P- Projections; Source: IMF- World Economic Outlook Database (October 2023)

[1] CY – Calendar Year

Advanced Economies Group

The major advanced economies registered GDP growth of 2.6% in CY22, down from 5.6% in CY21, which is further projected to decline to 1.5% in CY23. This forecast of low growth reflects increased central bank interest rates to fight inflation and the impact of the Russia-Ukraine war. About 90% of advanced economies are projected to witness decline GDP growth in CY23 compared to CY22. In addition, this is further expected to decline to 1.4% in CY24.

One of the major countries from this group is the **United States**. The United States registered GDP growth of 2.1% in CY22 compared to 5.9% in CY21. Whereas, growth for CY23 and CY24 is projected at 2.1% and 1.5%, respectively. Among advanced economies group, private consumption has been stronger in the United States than in the euro area. The business investments have also been robust in the second quarter, in addition, the general government fiscal stance of United States is expected to be expansionary in CY23. However, the unemployment rate is expected to rise coupled with declining wages and savings. With this, the GDP growth is expected to soften in near term.

Further, the **Euro Area** registered GDP growth of 3.3% in CY22 compared to 5.6% in CY21. For CY23 and CY24, the growth is projected at 0.7% and 1.2%, respectively. There is divergence in GDP growth across the euro area. Wherein, Germany is expected to witnesses slight contraction in growth due to weak interest rate sensitive sector and slow trading demand. On the other hand, the GDP growth for France has been revised upwards on account of growing industrial production and external demand.

Emerging Market and Developing Economies Group

For the emerging market and developing economies group, GDP growth stood at 4.1% in CY22, compared to 6.9% in CY21. This growth is further projected at 4.0% in CY23 and CY24. About 90% of the emerging economies are projected to make positive growth. While the remaining economies, including the low-income countries, are expected to progress slower.

Further, in **China**, growth is expected to pick up to 5.0% with the full reopening in CY23 and subsequently moderate in CY24 to 4.2%. The property market crisis and lower investment are key factors leading to this moderation. Whereas, **India** is projected to remain strong at 6.3% for both CY23 and CY24 backed by resilient domestic demands despite external headwinds.

The **Indonesian** economy is expected to register growth of 5% both in CY23 and CY24 with a strong recovery in domestic demands, a healthy export performance, policy measures, and normalization in commodity prices. In CY22, **Saudi Arabia** was the fastest-growing economy in this peer set with 8.7% growth. The growth is accredited to robust oil production, non-oil private investments encompassing wholesale and retail trade, construction and transport, and surging private consumption. Saudi Arabia is expected to grow at 0.8% and 4.0% in CY23 and CY24, respectively. On the other hand, **Brazil** is expected to project growth of 3.1% in CY23 driven by buoyant agriculture and resilient services in the first half of CY23.

Despite the turmoil in the last 2-3 years, India bears good tidings to become a USD 5 trillion economy by CY27. According to the IMF dataset on Gross Domestic Product (GDP) at current prices, the Nominal GDP has been estimated to be at USD 3.4 trillion for CY22 and is projected to reach USD 5.4 trillion by CY27. India's expected GDP growth rate for coming years is almost double compared to the world economy.

Besides, India stands out as the fastest-growing economy among the major economies. The country is expected to grow at more than 6% in the period of CY24-CY28, outshining China's growth rate. By CY27, the Indian economy is estimated to emerge as the third-largest economy globally, hopping over Japan and Germany. Currently, it is the third-largest economy globally in terms of Purchasing Power Parity (PPP) with a ~7% share in the global economy, with China [~18%] on the top followed by the United States [~15%]. Purchasing Power Parity is an economic performance indicator denoting the relative price of an average basket of goods and services that a household needs for livelihood in each country.

Despite Covid-19's impact, high inflationary environment and interest rates globally, and the geopolitical tensions in Europe, India has been a major contributor to world economic growth. India is increasingly becoming an open economy as well through growing foreign trade. Despite the global inflation and uncertainties, Indian economy continues to show resilience. This resilience is mainly supported stable financial sector backed by well-capitalized banks and export of services in trade balance. With this, the growth of Indian economy is expected to fare better than other economies majorly on account of strong investment activity bolstered by the government's capex push and buoyant private consumption, particularly among higher income earners.

1.2. Indian Economic Outlook

1.2.1 GDP growth and Outlook

Resilience to External Shocks remains Critical for Near-Term Outlook

India's real GDP grew by 9.1% in FY22 and stood at ~Rs. 149 trillion despite the pandemic and geopolitical Russia-Ukraine spillovers. In Q1FY23, India recorded 13.1% y-o-y growth in real GDP, largely attributed to improved performance by the agriculture and services sectors. Following this double-digit growth, Q2FY23 witnessed 6.2% y-o-y growth, while Q3FY23 registered 4.5% y-o-y growth. The slowdown during Q2FY23 and Q3FY23 compared to Q1FY23 can be attributed to the normalization of the base and a contraction in the manufacturing sector's output.

Subsequently, Q4FY23 registered broad-based improvement across sectors compared to Q3FY23 with a growth of 6.1% y-o-y. The investments, as announced in the Union Budget 2022-23 on boosting public infrastructure through enhanced capital expenditure, have augmented growth and encouraged private investment through large multiplier effects in FY23. Supported by fixed investment and higher net exports, real GDP for full-year FY23 was valued at ~Rs. 160 trillion registering an increase of 7.2% y-o-y.

Furthermore, in Q1FY24, the economic growth accelerated to 7.8%. The manufacturing sector maintained an encouraging pace of growth, given the favorable demand conditions and lower input prices. The growth was supplemented by a supportive base alongside robust services and construction activities. This momentum was maintained in the Q2FY24 with GDP growth at 7.6%, mainly supported by acceleration in investments. However, private consumption growth was muted due to weak rural demand and some moderation in urban demand amid elevated inflationary pressures in Q2FY24. On the supply side, a significant improvement in manufacturing and construction activities supported growth. Overall, the economy expanded by 7.7% in H1FY24 compared to 5.3% in H2FY23.

GDP Growth Outlook

- Driven by resilience in urban demand and the front loading of the government's capital expenditure, the H1FY24 witnessed a strong growth. While festive cheer will support urban demand in Q3FY24, the outlook for rural demand revival remains clouded amid monsoon deficiency and likely hit to the agricultural production.

- The recent announcements of various relief measures such as LPG price reduction and extension of Pradhan Mantri Garib Kalyan Anna Yojna (PMGKAY) are expected to provide some cushion and so far, investment demand has remained robust. However, there could be some moderation in H2FY24 as both the government and private sector may restrain their capital spending ahead of the general elections. Despite some expected moderation in the H2FY24, India's overall GDP growth for FY24 is expected to remain on a firm footing.

- Strong credit growth, resilient financial markets, and the government's continual push for capital spending and infrastructure are likely to create a compatible environment for investments.

- External demand is likely to remain subdued with a slowdown in global activities, thereby indicating adverse implications for exports. Additionally, heightened inflationary pressures and resultant policy tightening may pose a risk to the growth potential.

Taking all these factors into consideration, in December 2023, the RBI in its bi-monthly monetary policy meeting forecasted a real GDP growth of 7.0% y-o-y for FY24.

Table 2: RBI's GDP Growth Outlook (Y-o-Y %)

FY24P (complete year)	Q3FY24P	Q4FY24P	Q1FY25P	Q2FY25P	Q3FY25P
7.0	6.5	6.0	6.7%	6.5%	6.4%

Note: P – Projected; Source: Reserve Bank of India

1.1.2 Gross Value Added (GVA)

Gross Value Added (GVA) is the measure of the value of goods and services produced in an economy. GVA gives a picture of the supply side whereas GDP represents consumption.

Industry and Services sector leading the recovery charge

• The gap between GDP and GVA growth turned positive in FY22 (after a gap of two years) due to robust tax collections. Of the three major sector heads, the service sector has been the fastest-growing sector in the last 5 years.

• The **agriculture sector** was holding growth momentum till FY18. In FY19, the acreage for the rabi crop was marginally lower than the previous year which affected the agricultural performance. Whereas FY20 witnessed growth on account of improved production. During the pandemic-impacted period of FY21, the agriculture sector was largely insulated as timely and proactive exemptions from COVID-induced lockdowns to the sector facilitated uninterrupted harvesting of rabi crops and sowing of kharif crops. However, supply chain disruptions impacted the flow of agricultural goods leading to high food inflation and adverse initial impact on some major agricultural exports. However, performance remained steady in FY22.

Further, in Q1FY23 and Q2FY23, the agriculture sector recorded a growth of 2.4% and 2.5%, respectively, on a y-o-y basis. Due to uneven rains in the financial year, the production of some major Kharif crops, such as rice and pulses, was adversely impacted thereby impacting the agriculture sector's output. In Q3FY23 and Q4FY23, the sector recorded a growth of 4.7% and 5.5%, respectively, on a y-o-y basis.

Overall, the agriculture sector performed well despite weather-related disruptions, such as uneven monsoon and unseasonal rainfall, impacting yields of some major crops and clocked a growth of 4% y-o-y in FY23, garnering ~Rs. 22 trillion. In Q1FY24, this sector expanded at a slower pace of 3.5% compared to a quarter ago. This further stumbled to 1.2% in Q2FY24. Overall, H1FY24 registered a 2.4% growth with weakest monsoon experience caused by El Nino conditions

Going forward, rising bank credit to the sector and increased exports will be the drivers for the agriculture sector. However, a deficient rainfall may impact the reservoir level weighing on prospects of rabi sowing.

• The **industrial sector** witnessed a CAGR of 6.3% for the period FY16 to FY19. From March 2020 onwards, the nationwide lockdown due to the pandemic significantly impacted industrial activities. In FY20 and FY21, this sector felt turbulence due to the pandemic and recorded a decline of 1.4% and 0.9%, respectively, on a y-o-y basis. With the opening up of the economy and resumption of industrial activities, it registered 11.6% y-o-y growth in FY22, albeit on a lower base.

The industrial output in Q1FY23 jumped 9.4% on a y-o-y basis. However, in the subsequent quarter, the sector witnessed a sharp contraction of 0.5% due to lower output across the mining, manufacturing, and construction sectors. This was mainly because of the poor performance of the manufacturing sector, which was marred by high input costs. In Q3FY23, the sector grew modestly by 2.3% y-o-y. The growth picked up in Q4FY23 to 6.3% y-o-y owing to a rebound in manufacturing activities and healthy growth in the construction sector. Overall, the industrial sector is estimated to be valued at ~Rs. 45 trillion registering 4.4% growth in FY23.

The industrial sector grew by 5.5% in Q1FY24, while Q2FY24 growth was up by 13.2% owing to positive business optimism and strong growth in new orders supported manufacturing output. The industrial growth was mainly supported by sustained momentum in the manufacturing and construction sectors. Within manufacturing (as captured by IIP numbers), industries such as pharma, non-metallic mineral products, rubber, plastic, metals, etc., witnessed higher production growth during the quarter. The construction sector (13% growth in Q2FY24) benefited from poor rainfall during August and September and higher implementation of infrastructure projects. This was reflected in robust cement and steel production and power demand in Q2FY24. Overall, H1FY24 picked up by 9.3% with manufacturing and construction activities witnessing significant acceleration.

Forthcoming, despite the consumer market thriving in festive season in the second half of this fiscal, RBI monetary tightening could potentially curb credit growth and discretionary spending among urban households. Also, lagging rural consumption and election related capex hurdles in early 2024 is likely to pose slowdown in industrial segment, while this segment is signaling overall resurgence.

• The **services sector** recorded a CAGR of 7.1% for the period FY16 to FY20, which was led by trade, hotels, transport, communication, and services related to broadcasting, finance, real estate, and professional services. This sector was the hardest hit by the pandemic and registered an 8.2% y-o-y decline in FY21. The easing of restrictions aided a fast rebound in this sector, with 8.8% y-o-y growth witnessed in FY22.

In Q1FY23 and Q2FY23, this sector registered a y-o-y growth of 16.3% and 9.4%, respectively, on a lower base and supported by a revival in contact-intensive industries. Further, the services sector continued to witness buoyant demand and recorded a growth of 6.1% y-o-y in Q3FY23. Supported by robust discretionary demands, Q4FY23 registered 6.9% growth largely driven by the trade, hotel, and transportation industries. Overall, benefitting from the pent-up demand, the service sector was valued at ~Rs. 80 trillion and registered growth of 9.5% y-o-y in FY23.

Whereas in Q1FY24, the services sector growth jumped to 10.3%. Within services, there was a broad-based improvement in growth across different sub-sectors. However, the sharpest jump was seen in financial, real estate, and professional services. Trade, hotels, and transport sub-sectors expanded at a healthy pace gaining from strength in discretionary demand. The service sector growth in Q2FY24 moderated to 5.8% partly due to the normalization of base effect and some possible dilution in discretionary demand. Considering these factors, service sector marked 8% growth in H1FY24.

With this performance, steady growth in various service sector indicators like air passenger traffic, port cargo traffic, GST collections, and retail credit are expected to support the services sector.

Table 3: Sectoral Growth (Y-o-Y % Growth) - at Constant Prices

At constant Prices	FY18	FY19	FY20 (3RE)	FY21 (2RE)	FY22 (1RE)	FY23 (PE)	H1FY23	H1FY24
Agriculture, Forestry & Fishing	**6.6**	**2.1**	**6.2**	**4.1**	**3.5**	**4**	**2.4**	**2.4**
Industry	**5.9**	**5.3**	**-1.4**	**-0.9**	**11.6**	**4.4**	**4.3**	**9.3**
Mining & Quarrying	-5.6	-0.8	-3	-8.6	7.1	4.6	5.1	7.6
Manufacturing	7.5	5.4	-3	2.9	11.1	1.3	0.9	9.3
Electricity, Gas, Water Supply & Other Utility Services	10.6	7.9	2.3	-4.3	9.9	9	10.3	6.4
Construction	5.2	6.5	1.6	-5.7	14.8	10	10.7	10.5
Services	**6.3**	**7.2**	**6.4**	**-8.2**	**8.8**	**9.5**	**12.6**	**8.0**
Trade, Hotels, Transport, Communication & Broadcasting	10.3	7.2	6	-19.7	13.8	14	20.1	6.6
Financial, Real Estate & Professional Services	1.8	7	6.8	2.1	4.7	7.1	7.8	9.0
Public Administration, Defence and Other Services	8.3	7.5	6.6	-7.6	9.7	7.2	12.6	7.7
GVA at Basic Price	**6.2**	**5.8**	**3.9**	**-4.2**	**8.8**	**7**	**8.6**	**7.6**

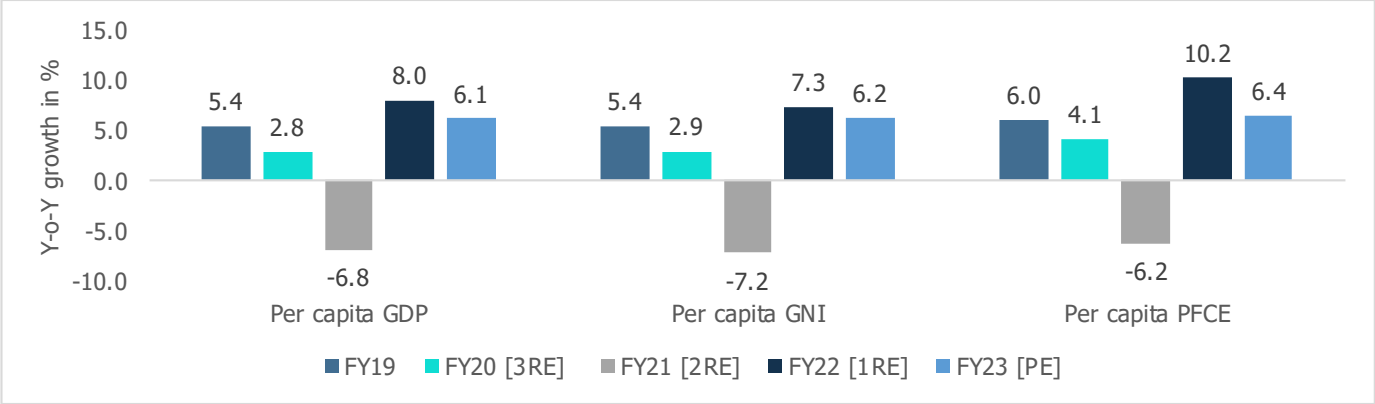
Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate; Source: MOSPI

Per capita GDP, Per Capita GNI and Per Capita PFCE

India has a population of about 1.4 billion with a young demographic profile. The advantages associated with this demographic dividend are better economic growth, rapid industrialization and urbanization.

Gross Domestic Product (GDP) per capita is a measure of a country's economic output per person. FY21 witnessed significant de-growth due to the pandemic. However, in FY22 the economy paved its way towards recovery and the per capita GDP grew by 8.0%. This growth was moderated to 6.1% due to the correction of base effect in FY23. The per capita Gross national income (GNI) also increased by 7.3% in FY22 and 6.2% in FY23. The per capita private final consumption expenditure (PFCE), which represents consumer spending, increased by 10.2% in FY22 and 6.4% in FY23.

Chart 2: Growth in Per Capita GDP, GNI and PFCE (Y-o-Y growth in %)

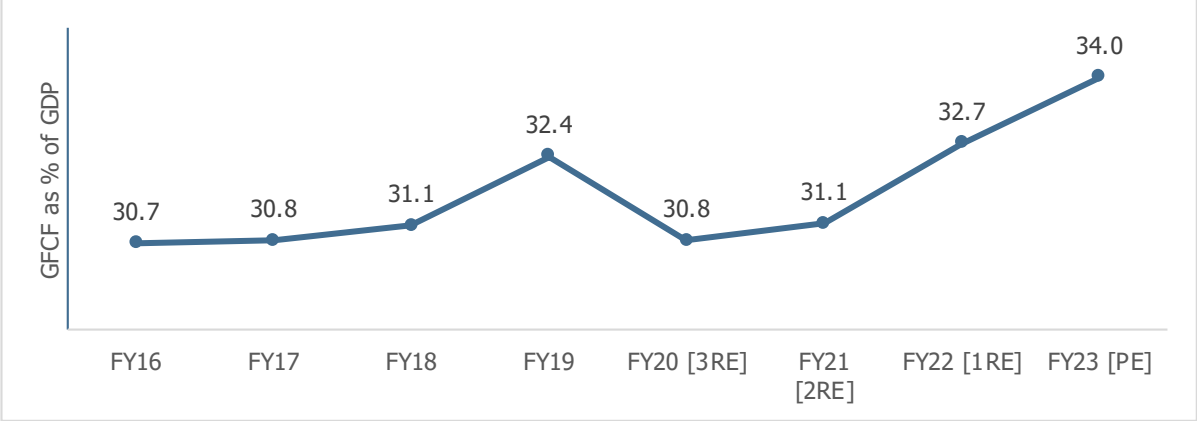


Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate; Source: MOSPI

1.2.3 Investment Trend in Infrastructure

Gross Fixed Capital Formation (GFCF), which is a measure of the net increase in physical assets, witnessed an improvement in FY22. As a proportion of GDP, it is estimated to be at 32.7%, which is the second-highest level in 7 years (since FY15). In FY23, the ratio of investment (GFCE) to GDP climbed up to its highest in the last decade at 34%, as per the advanced estimate released by the Ministry of Statistics and Programme Implementation (MOSPI).

Chart 3: Gross Fixed Capital Formation (GFCF) as % of GDP (At constant prices):



Note: 3RE – Third Revised Estimate, 2RE – Second Revised Estimates, 1RE – First Revised Estimates, PE – Provisional Estimate; Source: MOSPI

Overall, the support of public investment in infrastructure is likely to gain traction due to initiatives such as Atmanirbhar Bharat, Make in India, and Production-linked Incentive (PLI) scheme announced across various sectors.

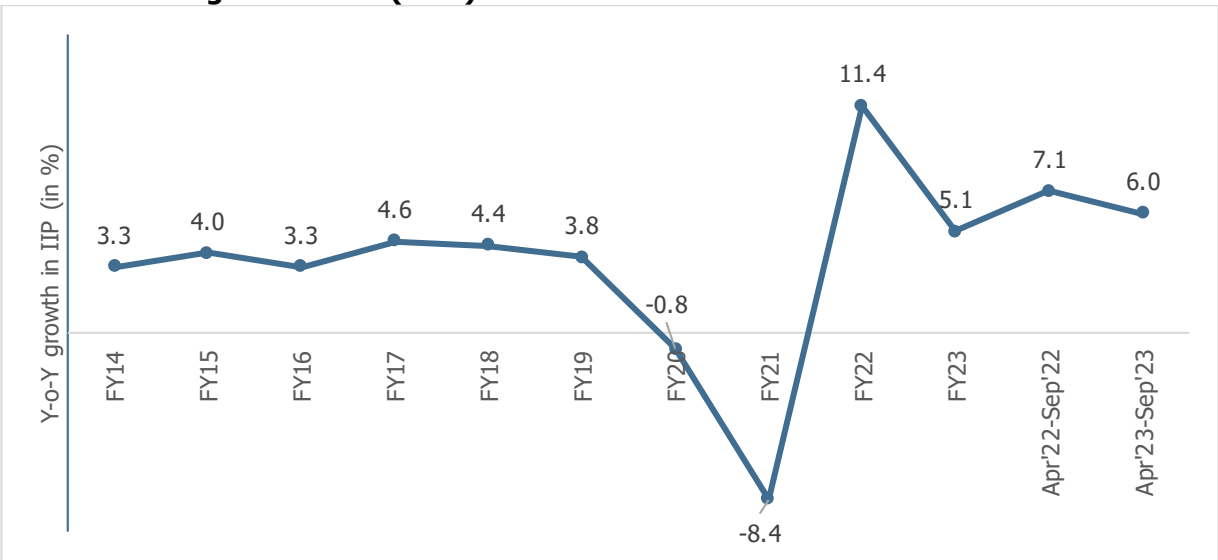
1.2.4 Industrial Growth

Improved Core and Capital Goods Sectors helped IIP Growth Momentum

The Index of Industrial Production (IIP) is an index to track manufacturing activity in an economy. On a cumulative basis, IIP grew by 11.4% y-o-y in FY22 post declining by 0.8% y-o-y and 8.4% y-o-y, respectively, in FY20 and FY21. This high growth was mainly backed by a low base of FY21. FY22 IIP was higher by 2.0% when compared with the pre-pandemic level of FY20, indicating that while economic recovery was underway, it was still at very nascent stages.

During FY23, the industrial output recorded a growth of 5.1% y-o-y supported by a favorable base and a rebound in economic activities. The period April 2023 – September 2023, industrial output grew by 6.0% compared to the 7.1% growth in the corresponding period last year. So far in the current fiscal, while the infrastructure-related sectors have been doing well, slowing global growth and downside risks to rural demand have posed a challenge for industrial activity. Though the continued moderation in inflationary pressure offers some comfort, pain points in the form of elevated prices of select food items continue to persist.

Chart 4: Y-o-Y growth in IIP (in %)



Source: MOSPI

1.2.5 Consumer Price Index

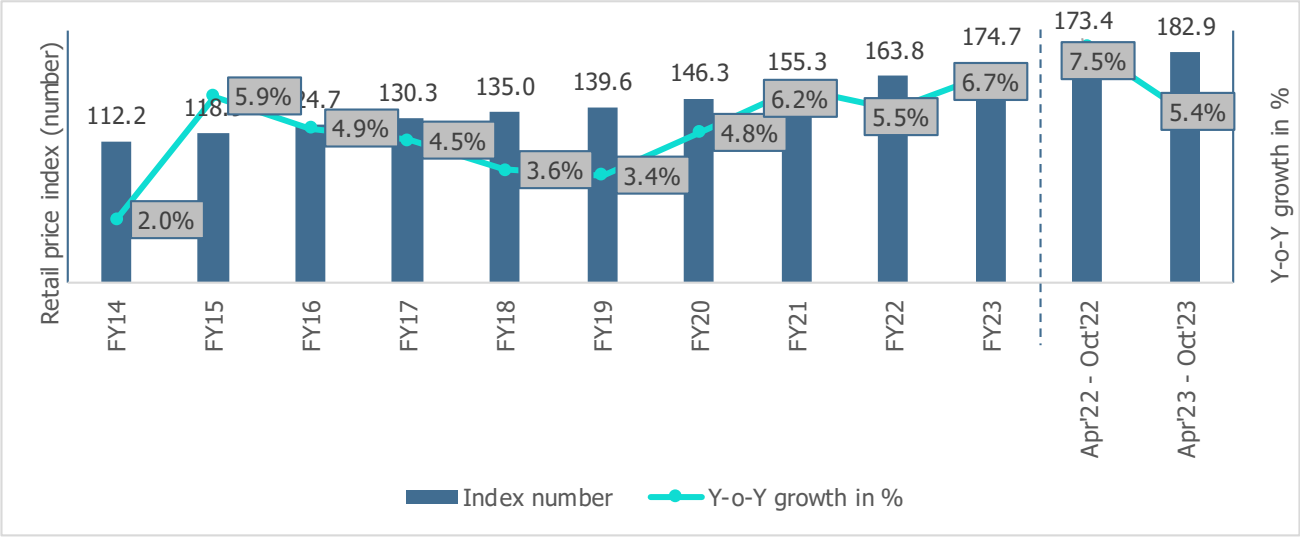
India's consumer price index (CPI), which tracks retail price inflation, stood at an average of 5.5% in FY22 which was within RBI's targeted tolerance band of 6%. However, consumer inflation started to upswing from October 2021 onwards and reached a tolerance level of 6% in January 2022. Following this, CPI reached 6.9% in March 2022.

CPI remained elevated at an average of 6.7% in FY23, above the RBI's tolerance level. However, there was some respite toward the end of the fiscal wherein the retail inflation stood at 5.7% in March 2023, tracing back to the RBI's tolerance band. Apart from a favorable base effect, the relief in retail inflation came from a moderation in food inflation.

In the current fiscal FY24, the CPI moderated for two consecutive months to 4.7% in April 2023 and 4.3% in May 2023. This trend snapped in June 2023 with CPI rising to 4.9%. In July 2023, the CPI had reached the RBI's target range for the first time since February 2023 at 7.4% largely due to increased food inflation. This marked the highest reading observed since the peak in April 2022 at 7.8%. The notable surge in vegetable prices and elevated inflation in other food categories such as cereals, pulses, spices, and milk have driven this increase. Further, the contribution of food and beverage to the overall inflation had risen significantly to 65%, surpassing their weight in the CPI basket. In August 2023, the food inflation witnessed some moderation owing to government's active intervention. This was further moderated for second consecutive month in September 2023 to 5%, led by a sharp correction in vegetables prices and lower LPG prices. Helped by deflation in the fuel and light category, the retail inflation in October 2023 softened at 4.9%.

Overall, the declining trend in the headline as well as core inflation is comforting in the current fiscal. However, it remains to be seen if it sustains, given the weak prospects for the Kharif harvest and the expected hit to Rabi sowing amid lower reservoir levels in major agricultural states.

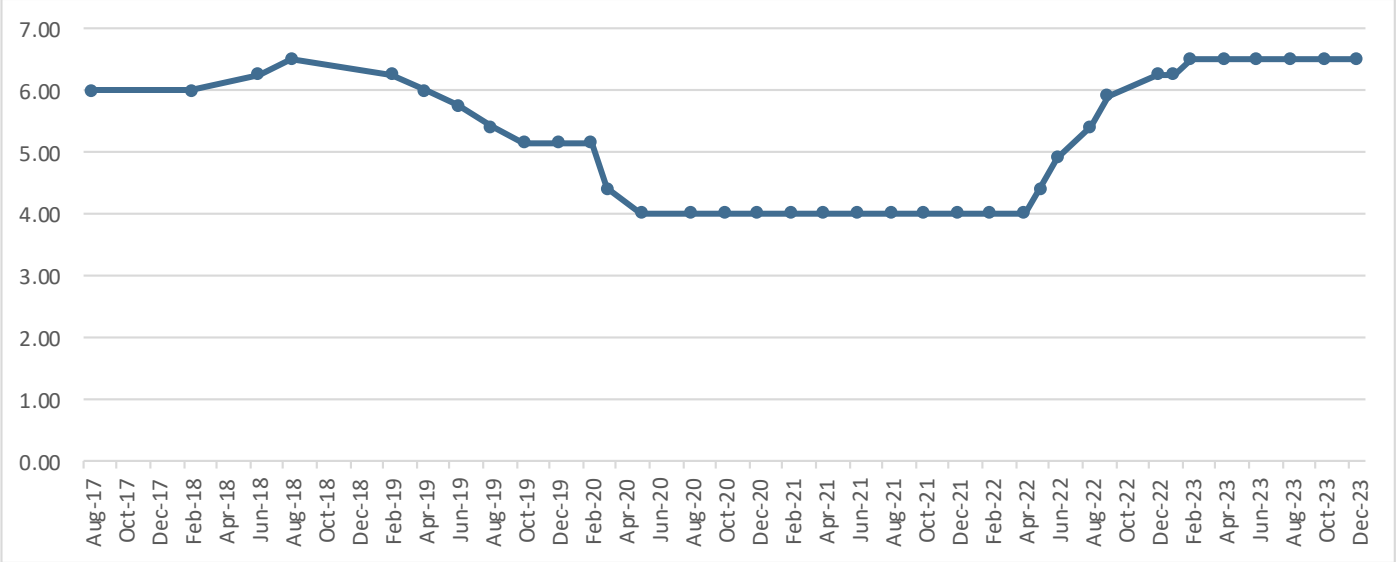
Chart 5: Retail Price Inflation in terms of index and Y-o-Y Growth in % (Base: 2011-12=100)



Source: MOSPI

The CPI is primarily factored in by RBI while preparing their bi-monthly monetory policy. The RBI has increased the repo rates with the rise in inflation in the past year from 4% in April 2022 to 6.5% in January 2023.

Chart 6: RBI historical Repo Rate



Source: RBI

However, with the inflation easing over the last few months, RBI has kept the repo rate unchanged at 6.5% in the last five meetings of the Monetary Policy Committee. At the bi-monthly meeting held in December 2023, RBI projected inflation at 5.4% for FY24 with inflation during Q3FY24 at 5.6%, Q4FY24 at 5.2% Q1FY25 at 5.2% , Q2FY24 at 6.5% and Q3FY24 at 6.4%.

In a meeting held inDecember 2023, RBI also maintained the liquidity adjustment facility (LAF) corridor by adjusting the standing deposit facility (SDF) rate of 6.25% as the floor and the marginal standing facility (MSF) at the upper end of the band at 6.75%.

Further, the central bank continued to remain focused on the withdrawal of its accommodative stance. With domestic economic activities gaining traction, RBI has shifted gears to prioritize controlling inflation. While RBI has paused on the policy rate front, it has also strongly reiterated its commitment to bringing down inflation close to its medium-term target of 4%. Given the uncertain global environment and lingering risks to inflation, the Central Bank has kept the window open for further monetary policy tightening in the future, if required.

1.2.6 Concluding Remarks

The major headwinds to global economic growth are escalating geopolitical tensions, volatile global commodity prices, and a shortage of key inputs. Despite the global economic growth uncertainties, the Indian economy is relatively better placed in terms of real GDP growth compared to other emerging economies. It is expected to grow at 6.3% in CY24 compared to the world real GDP growth projection of 3%. The bright spots for the economy are continued healthy domestic demand, support from the government towards capital expenditure, moderating inflation, and improving business confidence.

Likewise, several high-frequency growth indicators including the purchasing managers index, auto sales, bank credit, and GST collections have shown improvement in FY23. Moreover, normalizing the employment situation after the opening up of the economy is expected to improve and provide support to consumption expenditure.

Further, as per the Indian Meteorological Department (IMD), the rainfall witnessed a deficit until September 2023. A drop in yield due to irregular monsoons and a lower acreage can lead to a demand-supply mismatch, further increasing the inflationary pressures on the food basket. Moreover, the consumption demand is expected to pick up in Q3FY24 due to the festive season. Going forward, the rising domestic demand will be driven by the rural economy's performance and continual growth in urban consumption. However, high domestic inflation and global headwinds pose a downside risk to domestic demand.

At the same time, public investment is expected to exhibit healthy growth as the government has allocated a strong capital expenditure of about Rs. 10 lakh crores for FY24. The private sector's intent to invest is also showing improvement as per the data announced on new project investments. However, volatile commodity prices and economic uncertainties emanating from global turbulence may slow down the improvement in private CapEx and investment cycle.

2. Global Fluorochemicals & Specialty Gases Industry

2.1 Overview & Market Size

Fluorochemicals are organic or inorganic compounds that contain one or more fluorine atoms. Fluorine compounds find application majorly in commercial and industrial refrigeration, foam blowing agents, heat pump equipment, and solvents. One of the largest segments of global fluorochemicals market is fluorocarbons.

These are the kind of compounds formed when fluorine covalently bonds to carbon atoms in varying number and different configurations. The strength and stability of these bonds provides fluorocarbons with unique properties to function like refrigerants, lubricants, solvents, propellants and stain-repellent products.

Table 4: Types of Fluorochemicals and Specialty Gases

HCFCs (Hydrochlorofluorocarbons)	Hydrochlorofluorocarbons (HCFC) are the second generation of fluorine-based gases, HCFC was developed as a more environmentally friendly alternative to CFCs, as they have a lower ozone depletion potential (ODP) than CFCs, although they are still greenhouse gases with a medium/high global warming potential (GWP). As HCFCs contribute both to ozone depletion and global warming, the use of HCFCs is being phased out as part of global legislation.
HFCs (Hydrofluorocarbon)	Hydrofluorocarbons (HFC), are synthetic gas gases developed to replace CFC and HCFC. HFC contains fluorine, carbon and hydrogen. HFC have zero Ozone Depleting Potential (ODP). However, they have a notably high Global Warming Potential (GWP).
HFOs (Hydrofluoroolefins)	Hydrofluoroolefins (HFOs) are being developed as "fourth generation" refrigerants, HFO are unsaturated organic compounds composed of hydrogen, fluorine and carbon. HFO are categorized as having zero ozone depletion potential (ODP) and low global warming potential (GWP) compared to HFC and so offer a more environmentally friendly alternative to CFC, HCFC, and HFC.

The market for fluorochemicals and specialty gases has been growing and is further forecasted to grow at a CAGR of 10.3% from 10,963 USD million in 2024 to 16,223 USD million in 2028. The growth is majorly backed by the growing population and rapid urbanization. By application, automotive is the leading user segment for fluorochemicals. A larger population base over the world, warrants a need for more vehicles.

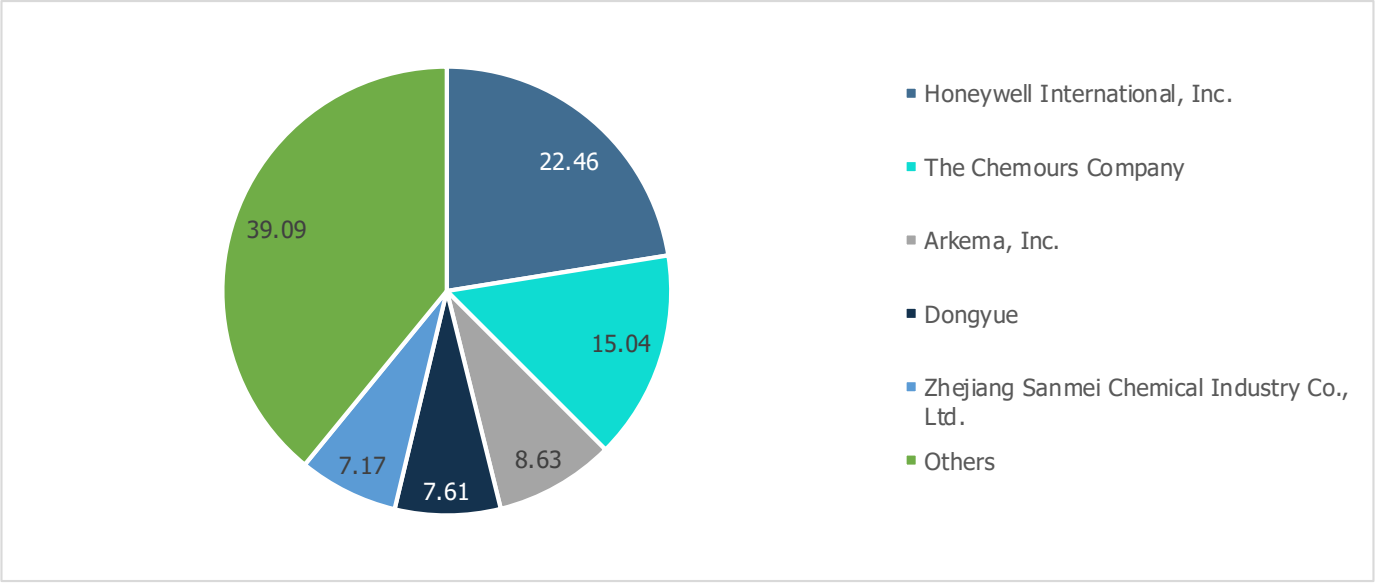
Chart 7: Global Market for Fluorochemicals & Specialty Gases

Source: CareEdge Research, Maia Research
Note: The year mentioned in this chart and subsequent sections is Calendar Year; E- Estimated; F- Forecasted
The market size includes the HCFC, HFC and HFO gases sub-segments of Fluorochemicals & Specialty Gases

2.2 Major Global Players

The market for fluorochemicals and specialty gases is vast. However, ~61% of the market is dominated by 5 players as mentioned below.

Chart 8: Market Share of Major Global Players (in %)



Source: CareEdge Research, Maia Research

- **Honeywell International Inc:** It is a multinational conglomerate corporation founded in 1906 and primarily operates in four areas of business majorly, aerospace, building technologies, performance materials and technologies and safety and productivity solutions. As on 2022, the company has the highest market share of 22.46%.

- **The Chemours Company:** Founded in 2015, with 35 manufacturing and laboratory sites worldwide that serve customers in approximately 120 countries. The company manufactures and sells performance chemicals that fall into the following segments – Titanium Technologies, Fluoroproducts and Chemical solutions. The market share of this company in 2022 was 15.04%.

- **Arkema Inc:** Arkema is a multi-national manufacturer of specialty chemicals founded in 2004. It has three divisions like adhesives, advanced materials and coatings. It operates in 55+ countries, has 13 research centres and 144 production plants. The market share of this company in 2022 was 8.63%.

- **Dongyue:** It was founded in 1987 and has become the leading in scale environment-friendly refrigerant basement in the world. Dongyue has developed a series of environment friendly and energy saving refrigerants. The market share of this company in 2022 was 7.61%.

- **Zhejiang Sanmei Chemical:** The company was founded in 2001 and is into manufacturing and distributing chemical products. They produce fluorine refrigerant, blowing agents and other related products. The market share of this company in 2022 was 7.17%.

2.3 Key Application of Fluorochemicals & Specialty Gases

Fluorochemicals and specialty gases have a range of applications across various industries due to their unique properties. Here are key applications for each:

I. Fluorochemicals:

- **Refrigerants:** Refrigerants are chemicals that produce cooling effect while expanding or vaporizing. Fluorocarbons are commonly used as refrigerants in air conditioning and refrigeration systems due to their low boiling points and thermal conductivity. They are also used in heat pump water heaters, dehumidifiers, refrigerated dryers, cold storage, etc.

- **Foam blowing agents:** A foaming agent is a substance that can create cellular structures by the process of foaming in all range of materials that go through the phase of hardening such as polymers, plastics and metals. Fluorochemicals are used as blowing agents in the production of foams, such as in the manufacturing of insulation materials and packaging foams.

- **Solvents:** Some fluorochemicals serve as specialized solvents in applications where chemical resistance, thermal stability, and electrical insulating properties are essential. The solvents are composed of carbon and fluorine atoms which exhibit a range of interesting characteristics that make them suitable for specific tasks.

- **Fluoropolymers:** Fluoropolymers are a class of synthetic polymers that contain fluorine atoms in their chemical structure. Fluorochemicals play a crucial role in the production of fluoropolymers, serving as monomers or building blocks in the polymerization process. The most common fluorochemicals used in the production of fluoropolymers include tetrafluoroethylene, hexafluoropropylene, etc. Fluoropolymers like PTFE (Teflon) are widely used in the production of non-stick coatings for cookware, gaskets, seals, and as a lining for pipes and tanks due to their chemical resistance.

- **Medical & Electronic Applications:** Fluoropolymers are used in medical applications, such as coatings for medical devices and implants, due to their thermal stability, chemical inertness, biocompatibility and resistance to bodily fluids. Fluorochemicals are used in the electronics industry for applications like etching and cleaning in semiconductor manufacturing.

- **Propellants:** Fluorochemicals are highly regarded and used as propellants for their reliability and durability and are widely used for important components. To improve structural materials and electronic parts, the need for fluorochemicals is increasing.

II. Specialty Gases

- **Analytical Instruments & Calibration Standards:** High-purity specialty gases are crucial for analytical instruments since they provide accurate measurements and analyses. They are used in gas chromatographs, mass spectrometers, and another laboratory equipment. Specialty gases are also used as calibration standards for various instruments, ensuring accuracy and reliability in measurements.

- **Medical Gases:** Gases such as medical oxygen, nitrous oxide, and medical-grade air are critical in healthcare for respiratory therapy, anaesthesia, and other medical applications. Medical gases are used in healthcare settings for patient treatment, diagnostics, and support.

- **Semiconductor Manufacturing:** Specialty gases are essential in semiconductor manufacturing processes, including chemical vapor deposition (CVD) and etching, where precise control of gas composition is crucial.
- **Welding and Metal Fabrication:** Specialty gases are used in metal fabrication processes, including welding and cutting, to provide controlled atmospheres and heat sources.
- **Food and Beverage Industry:** Gases like nitrogen and carbon dioxide are used in the food and beverage industry for packaging, preservation, and carbonation. These gases help in enhancing product quality, safety and shelf life.

These applications demonstrate the diverse uses of fluorochemicals and specialty gases in industries ranging from electronics and healthcare to manufacturing and environmental monitoring. The unique properties of these substances make them indispensable in various technological and industrial processes.

3. Indian Fluorochemicals & Specialty Gases Market

3.1 Overview & Market Size

The Indian Fluorochemicals and Specialty Gases market is anticipated to witness substantial growth, with a projected CAGR of 17% during the forecast period from 2024 to 2028. This growth will be driven by rising demand from various industries, including electronics, healthcare, and manufacturing. The market is characterized by a diverse range of products, including fluoropolymers, fluorocarbons, and specialty gases. The growth is also attributed to the ongoing expansion of industries and the increasing demand for high-performance materials. The proliferation of chemical manufacturing facilities in India has further fueled the need for fluorochemicals and specialty gases. These materials are indispensable in various applications, including lining materials for chemical storage tanks, corrosion-resistant linings, gaskets, seals, wire and cable insulation, semiconductor manufacturing, and dielectric materials, due to their exceptional chemical resistance and ability to withstand high temperatures.

The electrical and electronics industry is the largest consumer of fluorochemicals and specialty gases in India, fueled by rapid industrial growth and the increasing demand for electronic devices. Fluorochemicals and specialty gases are essential components in printed circuit boards (PCBs), microelectronics, and LED lighting, driven by their exceptional electrical insulation properties, high dielectric strength, and resistance to extreme temperatures.

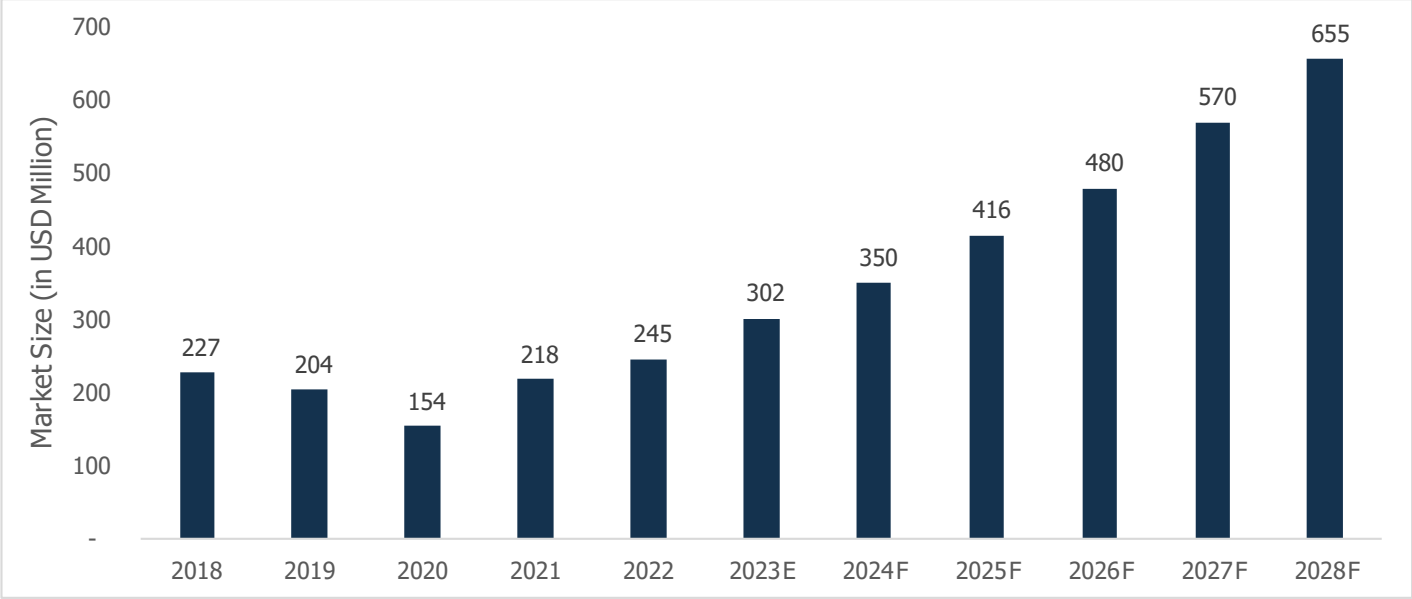
Fluorochemicals play a crucial role in propelling the growth of the pharmaceutical and healthcare sector. The Indian pharmaceutical industry's growing demand for innovative and complex drug molecules has driven the need for custom synthesis and advanced fluorination technologies. Specialty gases also play a vital role in medical processes and systems, with customized medical gas mixes utilized in various medical activities, such as patient care, pathology, and research.

The production of refrigerants in India is a significant contributor to the demand for fluoropolymers, particularly in air conditioning and refrigeration systems. Additionally, fluoropolymers are gaining traction in the automotive, pharmaceutical, and renewable energy sectors due to their biocompatibility, chemical resistance, and ability to withstand extreme temperatures. Major infrastructure development projects in rising economies such as India provide several opportunities for industry participants. Additionally, rapid technological improvements and product innovations are projected to boost the growth of this market.

The Indian government's "Make in India" initiative has attracted significant foreign investment and technological advancements in the electronics manufacturing sector. This surge in domestic production has further stimulated the demand for specialized fluorochemicals and specialty gases, solidifying the electrical and electronics industry's dominance in the India fluorochemicals and specialty gas market.

By capitalizing on these opportunities and addressing the challenges faced by the industry, such as environmental regulations, pricing volatility, and competition from imports, companies can position themselves for success in the promising Indian fluorochemicals and specialty gases market. The government's focus on promoting manufacturing and infrastructure development is also expected to boost the demand for these products. Companies operating in this market need to focus on developing innovative products, improving production efficiency, and expanding their market reach to capitalize on the growth opportunities.

Chart 9: India Fluorochemicals & Specialty Gases Market Size



Source: CareEdge Research, Maia Research
Note: The market size includes the HCFC, HFC and HFO gases sub-segments of Fluorochemicals & Specialty Gases

3.2 Growth Drivers of Indian Fluorochemicals & Specialty Gases Market

The Indian fluorochemicals and specialty gases market is also benefiting from factors such as Increasing demand for fluorochemicals in construction and infrastructure applications, growing adoption of fluorochemicals in the textile industry for water- and stain-repellency, expanding use of specialty gases in environmental monitoring and pollution control and rising demand for specialty gases in the aerospace and defense sectors. This market is expected to witness significant growth in the coming years, driven by several factors:

- **Industrialization and urbanization in India:**

Industrialization is the process of transformation of any given agricultural society into an industrial society. Industrialization involves social and economic changes and the broad reorganization of the manufacturing economy. Urbanization involves the migration or transfer of rural populations to urban areas. Industrialization and urbanization are interrelated. Increased industrialization increased employment opportunities. These opportunities attract rural people to migrate to cities and build more cities, especially among younger generations. As a result, the construction industry and service industries have also developed rapidly, creating more jobs. As a result of these events, India's industrialization and urbanization levels increased, and the country's economy rapidly improved. Therefore, the increased industrial categories and output value in the industry have put forward higher requirements for common industrial procedures such as refrigeration and foaming. On the other hand, due to urban population growth and business growth, demand for various end products such as air conditioners, automobiles, electronic products, food, pharmaceuticals, etc. has increased. These factors promote the widespread use of fluorochemicals and specialty gases.

- **Rising Demand from Electronics Industry:**

The increasing demand for semiconductors and electronic devices, particularly in the telecommunications and data storage sectors, is driving the demand for fluoropolymers and specialty gases used in their production. Fluoropolymers are used in printed circuit boards (PCBs), microelectronics, and LED lighting due to their exceptional electrical insulation properties,

high dielectric strength, and resistance to extreme temperatures. Specialty gases, such as high purity gases and noble gases, are also used in semiconductor manufacturing and analytical instrumentation.

Electronic systems design and manufacturing (ESDM) is the world's fastest-growing industry, continuing to transform lives, businesses and economies around the world. India is no exception to this. Advances in the electronics industry are not limited to specific areas but encompass all areas. Considerable progress has been made in commercial electronics, software, telecommunications, instrumentation, positioning and networking systems, and defense. Technology transformations such as the rollout of 5G networks and the Internet of Things are driving accelerated adoption of electronics. Initiatives such as "Digital India" and "Smart City" projects have increased the demand for IoT in the electronic equipment market and will undoubtedly usher in a new era of electronic products.

- **Expansion of Healthcare Sector:**

The growing population and increasing healthcare expenditure are driving the demand for fluoropolymers and specialty gases used in medical devices, implants, and surgical equipment. Fluoropolymers like Gore-Tex and PTFE are used in medical devices, such as artificial joints, stents, and catheters, due to their biocompatibility and non-stick properties. Specialty gases, such as medical gases and sterile gases, are used in various medical procedures, including anaesthesia, surgery, and diagnostic imaging.

- **Rising Demand from Manufacturing Industries:**

The expansion of manufacturing industries, particularly in the automotive, aerospace, and chemical sectors, is driving the demand for fluorochemicals and specialty gases used in various applications. Fluorochemicals are used in coatings, paints, and sealants for automotive components, as well as in refrigerants and lubricants. Specialty gases are used in welding, metal cutting, and brazing, as well as in analytical instruments and quality control processes.

- **Wide range of applications of refrigerants:**

Refrigerants are an essential part of modern life, playing a vital role in various industries including healthcare, fire protection, food production and supply, and transportation. For example, food preservation, pharmaceutical storage, cold chain transportation, etc. Every industry has different refrigeration needs, and refrigeration is key to maintaining ideal conditions for your product or process. On the other hand, homes and commercial buildings use a lot of air conditioning equipment. In a world that is rapidly warming and where extreme heat events are more frequent and intense, access to indoor cooling is critical to ensuring health and safety. Air conditioning enables people to work and study efficiently and reduces the risk of heat-related illnesses. Terminal equipment with refrigerant as the core provides refrigeration for these scenarios to ensure normal life and production. The wide range of application scenarios promotes the large-scale use of refrigerants, thus causing the rapid growth of the fluorochemicals and specialty gases industry.

- **Extensive use of Foam Blowing Agents:**

Foam blowing agents are one of the main applications of fluorochemicals. Foam blowing agents are materials that promote foam formation and can reduce the surface tension of a liquid or increase its colloidal stability by inhibiting the coalescence of bubbles, thus forming a uniform and stable foam. Foam blowing agents help create voids in areas that would normally be solid plastic. This not only reduces the weight of the finished product but also reduces the amount of plastic used. Lighter weight products reduce transportation costs and reduce environmental impact. Common areas of use include building insulation, automobiles, furniture, and packaging. In addition, since fluorochemicals form a water film between the flammable liquid and the foam, allowing the foam to spread easily and extinguish the flame quickly, it can be used in firefighting foam. This kind of fire-fighting foam is mainly used to extinguish flammable liquids such as gasoline.

- **Environmental Regulations and Sustainability:**

The growing emphasis on environmental sustainability and emission reduction is driving the demand for fluorochemicals and specialty gases with lower environmental impact. For instance, the use of fluoropolymers in insulation materials can

reduce energy consumption and greenhouse gas emissions. Specialty gases, such as fluorinated gases with low global warming potential (GWP), are being increasingly used in refrigeration and air conditioning applications.

- **Government Policies and Initiatives:**

The Indian government's policies, such as the Make in India initiative and the Production Linked Incentive (PLI) Scheme, are encouraging domestic production and investment in the fluorochemicals and specialty gases sectors. These policies aim to reduce reliance on imports, enhance manufacturing capabilities, and promote innovation in these industries.

3.3 Opportunities under Indian Fluorochemicals & Specialty Gases Market

The Indian fluorochemicals and specialty gases market presents numerous opportunities for growth and expansion. The Upgrade and iteration of Fluorochemicals products, whether used as refrigerants or blowing agents, the product performance, ozone depletion potential (ODP), and global warming potential (GWP) of fluorochemicals have attracted much attention. Fluorochemicals have undergone many generations of product improvements. The first generation of fluorochemicals used as refrigerants and blowing agents were chlorofluorocarbons (CFCs), which have been phased out globally due to their serious damage to the ozone layer. The second generation is hydrochlorofluorocarbons (HCFCs). Although these products contain chlorine, the incorporation of hydrogen makes them less damaging to the ozone layer. In developed countries and regions such as Europe and the United States, this type of product has been banned. On the other hand, developing countries still use it, but it is expected to be banned by 2040. The third generation is hydrofluorocarbons (HFCs), which are substances that help prevent damage to the ozone layer. The 1987 Montreal Protocol proposed phasing out the use of chlorofluorocarbons and other ozone-depleting substances, resulting in the widespread use of hydrofluorocarbons (HFCs). However, it was found to be a compound that contributes to the greenhouse effect. Hydrofluorocarbons (HFCs) were listed as greenhouse gases in the 1997 Kyoto Protocol. The fourth generation is hydrofluorocarbons (HFO), which are derived from participating fuels produced in the crude oil distillation process and have low global warming potential (GWP) and low ozone depletion potential (ODP). It is considered an environmentally friendly alternative to other types of fluorochemical products.

Some of the opportunities for growth in this market includes:

- **Expanding Industrial Demand:**

The increasing demand for fluorochemicals and specialty gases across various industries, including electronics, healthcare, manufacturing, construction, and textiles, presents a significant growth opportunity for market players.

- **Import Substitution:**

The Indian government's focus on import substitution and promoting domestic manufacturing creates an opportunity for companies to establish themselves as key suppliers of fluorochemicals and specialty gases, reducing reliance on imports.

- **Innovation and Technology Advancement:**

The development of new and innovative fluorochemicals and specialty gases with improved properties and applications can expand market reach and cater to emerging needs.

- **Environmental Sustainability:**

The growing emphasis on environmental sustainability and emission reduction opens up opportunities for the development of eco-friendly fluorochemicals and specialty gases with lower environmental impact.

- **Expansion into New Applications:**

Exploring untapped applications and expanding into new markets, such as renewable energy, nanotechnology, and biotechnology, can create fresh growth avenues for market players.

- **Strategic Partnerships and Collaborations:**

Forming strategic partnerships and collaborations with industry leaders, research institutions, and technology providers can accelerate innovation and market expansion.

- **Focus on Capacity Building and Infrastructure:**

Investing in capacity expansion and upgrading infrastructure can help companies meet the growing demand and enhance their competitive edge.

- **Export Potential:**

Expanding into international markets and exploring export opportunities can provide additional growth avenues for Indian fluorochemicals and specialty gases companies.

3.4 Government policies regarding specialty gases and shifting from Sunset Gases (CFC, HCFC) to Sunrise Gases (HFO)

The shift from CFC and HCFC gases to HFO gases in India is a critical step towards reducing the country's greenhouse gas emissions and mitigating climate change. CFCs (chlorofluorocarbons) and HCFCs (hydrochlorofluorocarbons) are potent ozone-depleting substances and greenhouse gases that have been widely used in refrigerants, foam-blowing agents, and other applications. However, due to their environmental impact, the production and consumption of CFCs and HCFCs have been phased out under the Montreal Protocol, an international treaty aimed at protecting the ozone layer.

HFOs (hydrofluoroolefins) are a class of fluorinated gases that offer a number of advantages over CFCs and HCFCs. They have a very low global warming potential (GWP), which means they trap less heat in the atmosphere than CFCs and HCFCs. Additionally, HFOs have a shorter atmospheric lifetime, meaning they break down more quickly in the atmosphere.

The transition to HFOs in India is being driven by a number of factors, including:

- The Montreal Protocol's phase-out of CFCs and HCFCs
- India's commitment to reducing greenhouse gas emissions
- The availability of affordable HFO alternatives

The Indian government has implemented a number of policies to support the transition to HFOs, including:

- Providing financial incentives for the production and use of HFOs
- Raising awareness of the environmental benefits of HFOs
- Supporting the development of HFO-based technologies

Here are some of the benefits of shifting from CFC and HCFC gases to HFO gases in India:

- **Reduced ozone depletion:** HFOs do not deplete the ozone layer, unlike CFCs and HCFCs.
- **Reduced greenhouse gas emissions:** HFOs have a very low global warming potential (GWP), which means they trap less heat in the atmosphere than CFCs and HCFCs.
- **Improved energy efficiency:** HFO-based refrigerants can be more energy efficient than CFC- and HCFC-based refrigerants.
- **Reduced health risks:** HFOs are not as toxic as CFCs and HCFCs.

The Government of India, in recognition of HFCs' role in amplifying global warming, agreed to curtail HFC emissions, as part of the Kigali Amendment to the Montreal Protocol. India invoked its global leadership and negotiated for a longer timeline for itself, as part of a distinct track of countries, to phase-down emissions arising from HFC production and consumption. This timeline was markedly different from that of other country groupings, keeping in mind the technological and financial burden that such a transition would place on its development agenda. This extended phase-down period allows India to recalibrate strategies and plans to successfully meet its international commitments, while ensuring that gains on other domestic frontlines, such as industrial productivity, jobs and skilling, manufacturing capacity, technology improvements and R&D, and energy efficiency, are optimised.

Table 5: Phase-down commitments under the Kigali Amendment to the Montreal Protocol

Baseline years	»» 2011, 2012, 2013	»» 2011, 2012, 2013	»» 2020, 2021, 2022	»» 2024, 2025, 2026
Baseline Calculation	Average production/ consumption of HFCs in baseline years, plus 15% of hydrochlorofluorocarbon (HCFC) baseline production/consumption	Average production/ consumption of HFCs in baseline years, plus 25% of HCFC baseline production/consumption	Average production/ consumption of HFCs in baseline years, plus 65% of HCFC baseline production/consumption	Average production/ consumption of HFCs in baseline years, plus 65% of HCFC baseline production/consumption
Reduction Step 1	2019: 10%	2020: 5%	Freeze: 2024	Freeze: 2028
Reduction Step 2	2024: 40%	2025: 35%	2029: 10%	2032: 10%
Reduction Step 3	2029: 70%	2029: 70%	2035: 30%	2037: 20%
Reduction Step 4	2034: 80%	2034: 80%	2040: 50%	2042: 30%
Reduction Step 5	2036: 85%	2036: 85%	2045: 80%	2047: 85%

Source: CareEdge Research, CEEW (Council on Energy, Environment and Water)
Note: Based on OzonAction (2016). * This is calculated as 85 per cent of the average production/consumption of HFCs in baseline years, plus 25 per cent of HCFC baseline production/ consumption (average for the years 2024–2026).

The Indian fluorochemicals and specialty gases market is expected to witness significant growth in the coming years. The shift from CFC and HCFC gases to HFO gases is a positive step for India's environment and its commitment to climate change mitigation. As the transition continues, India is expected to see further reductions in ozone depletion and greenhouse gas emissions, as well as improved energy efficiency and reduced health risks.

3.5 Government Initiatives & Policies for Fluorochemicals & Specialty Gases in India

The Indian government has implemented several policies and initiatives to promote the development and growth of the fluorochemicals and specialty gases industry. These initiatives aim to address the challenges faced by the industry, such as high dependence on imports, lack of domestic manufacturing capabilities, and the need for innovation and technology advancement. Some of the key government policies in this regard includes:

- **Fluorochemicals and Specialty Gases (FSG) Policy:**

The FSG Policy provides a comprehensive framework for the development and growth of the fluorochemicals and specialty gases industries in India. The policy outlines the government's objectives, strategies, and measures to promote the industry, including:

- Promotion of domestic production of fluorochemicals and specialty gases
- Encouragement of FDI and technology transfer
- Support for research and development
- Development of infrastructure for production, storage, and transportation
- Promotion of exports

- **The Hydrocarbon Exploration and Licensing Policy (HELP):**

The HELP is a policy initiative aimed at boosting domestic production of oil and gas in India. The policy provides a transparent and simplified mechanism for awarding exploration and production (E&P) contracts. This is expected to create opportunities for the specialty gases industry, as it will require increased demand for specialty gases used in exploration and production activities.

- **The Make in India Initiative:**

Make in India is a national program that aims to transform India into a global manufacturing hub. This initiative provides various incentives and support including tax breaks, subsidies, and access to capital to domestic manufacturers of fluorochemicals and specialty gases, encouraging investment and expansion in the sector.

- **The Production Linked Incentive (PLI) Scheme:**

The PLI Scheme is a government program that provides financial support to companies that invest in manufacturing high-tech products. The scheme has been extended to the fluorochemicals and specialty gases sector, offering incentives for the production of high-purity gases, noble gases, and medical gases. This scheme is expected to attract investment these industries and boost domestic production.

- **The National Gas Policy:**

The National Gas Policy outlines the government's strategy for promoting the development and utilization of natural gas in India. The policy emphasizes the importance of natural gas as a cleaner and more efficient fuel source compared to coal. It also encourages the development of natural gas pipelines and infrastructure to facilitate the transportation and distribution of natural gas. This policy is expected to create demand for specialty gases used in natural gas processing and transportation.

- **The Petroleum and Natural Gas Regulatory Board (PNGRB):**

The PNGRB is a regulatory body established by the GoI to regulate the natural gas sector in India. The PNGRB regulates the pricing, transportation, and distribution of natural gas. It also sets standards for the quality and safety of natural gas and its transportation infrastructure. The PNGRB's regulations are expected to promote the efficient and safe use of natural gas, which will create demand for specialty gases used in various natural gas applications.

- **Regulatory Compliance and Certifications:**

The government is working to simplify and streamline regulatory compliance procedures for the fluorochemicals and specialty gases industries. This includes initiatives such as providing clear and consistent guidelines, reducing the number of approvals required, and promoting self-certification.

- **Sustainability Initiatives:**

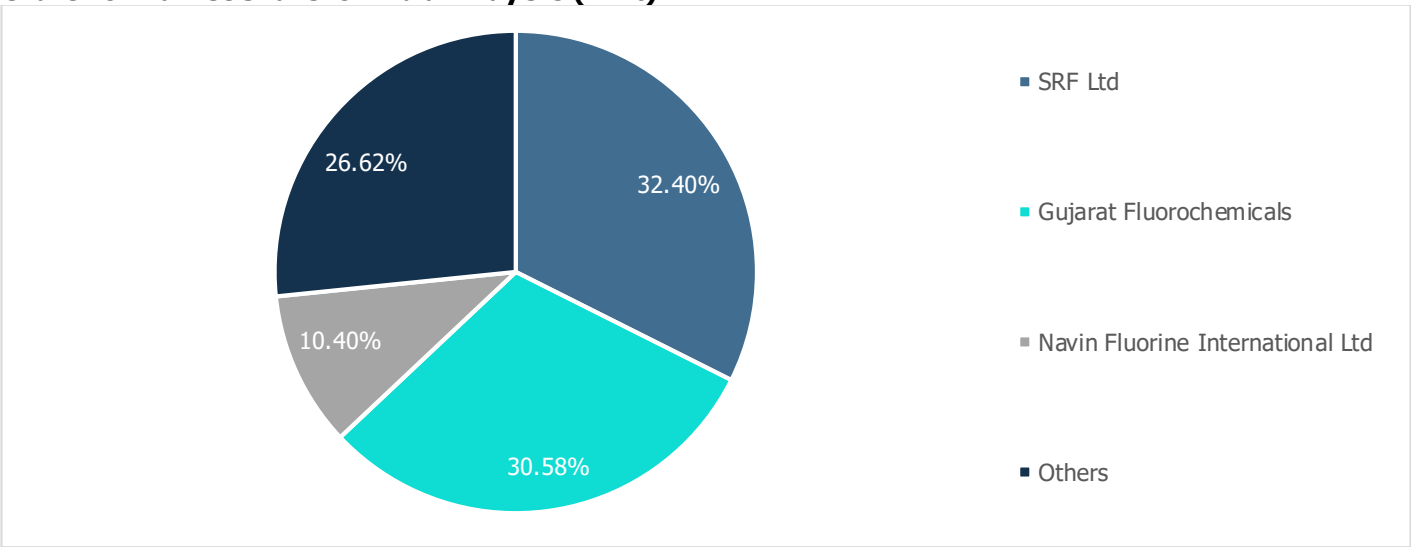
The government is promoting the use of fluorochemicals and specialty gases with lower environmental impact. This includes initiatives such as promoting the use of recycled fluoropolymers, developing eco-friendly manufacturing

processes, and supporting research on the development of new environmentally sustainable fluorochemicals and specialty gases.

3.6 Major Indian Players

Major Indian players of the fluorochemicals and specialty gas industry is as follows;

Chart 10: Market Share for Indian Players (in %)



Source: CareEdge Research, Maia Research

- **SRF Ltd:** Founded in 1970, SRF limited is an Indian multi-business conglomerate engaged in manufacturing of industrial and specialty intermediates. The company's portfolio covers fluorochemicals, specialty chemicals, packaging films, coated and laminated fabrics. They have total 11 manufacturing plants across India, Thailand, South Africa and Hungary. As on 2022, SRF Ltd has the highest market share of 32.40%.

- **Gujarat Fluorochemicals Ltd (GFL):** Gujarat Fluorochemicals was incorporated in 1987 and is an industrial refrigerant manufacturer in India. It is one of the largest producers of chloromethane, refrigerants and polytetrafluoroethylene (PTFE). GFL has 2 manufacturing plants in Gujarat, a refrigerant plant at Ranjitnagar and PTFE facility at Dahej. GFL has the second highest market share of 30.58% as on 2022.

- **Navin Fluorine International Ltd (NFIL):** NFIL was established in 1967 and is one of the largest integrated fluorochemicals complexes in India with manufacturing locations at Dahej and Surat and Dewas. Their main business units are – refrigeration gases, inorganic fluorides, specialty fluorides and contract development and manufacturing organisation. In 2022, NFIL has the third highest market share of 10.40%.

3.7 Major Risk Factors to the Industry

Some of the common risk factors associated with fluorochemicals and specialty gas industry are;

- **Flammability and Explosiveness:** Fluorochemicals and specialty gases are commonly used in various industrial applications, including electronics manufacturing, pharmaceuticals, and the semiconductor industry. While these substances serve important functions, it's crucial to consider their flammability and explosiveness risk factors to ensure safety in handling, storage, and transportation. Adequate safety protocols and precautions must be in place to prevent accidents, including proper storage, handling, and transportation procedures.

- **Chemical exposure and toxicity:** There are various health hazards and associated with the exposure to chemicals because of the toxic nature of the chemicals. Managing the exposure and toxicity risks requires a comprehensive approach which includes proper handling procedures, risk assessment, engineering controls and adherence to regulatory standards.

- **Regulatory Compliance:** The chemical industry is subject to various regulations and standards. And the non-compliance of these regulations can result in legal and financial consequences. Staying informed about these regulations and being compliant is of utmost importance.

- **Supply chain disruptions:** Fluorochemicals and specialty gases industry relies heaving on global supply chain for raw materials and other components. Due to any natural disaster or geopolitical event, the companies in this sector may be impacted which in turn will adversely affect the product and distribution in our country.

- **Technological risks:** The industry relies on advanced technologies for the production and purification process of the chemicals and gases. In case of any technological failures or outdated infrastructure, it can lead to operational disruption, safety issues and increased costs.

- **Global Economic Factors:** Fluctuations of downturns in currency exchange rates directly impact the profitability of the companies in fluorochemicals and specialty gases industry. This makes it essential for companies to manage financial risk and maintain financial resilience.

- **Emerging contaminants and substitutes:** There is a need to replace traditional fluorochemicals and there are alternatives being developed. And the industry may face challenges related to the new contaminants or chemicals.

Companies in the industry need to be proactive and in identifying and managing these risk factors to ensure the safety of workers, compliance with regulation and overall business continuity.

3.8 SWOT Analysis

Strength	Weakness
• Chemical expertise • High entry barriers • Regulatory compliance • Global market presence	• Technological risk • Supply chain constraints • Dependence on raw materials • Market volatility
Opportunities	**Threat**
• Emerging markets • Diversification of product portfolio • Green technologies • Strategic partnerships	• Regulatory changes • Competitive pressure • Substitute products • Geopolitical risks

Source: CareEdge Research, Maia Research

I. Strengths

- **Chemical expertise**

Companies in this industry typically possess advanced chemical expertise, allowing them to develop and produce specialized fluorochemicals and gases.

- **High entry barriers**

Due to specialized knowledge, technology and infrastructure required, this industry has high entry barriers reducing the threat of new entrants.

- **Regulatory compliance**

Adherence to strict safety and environmental regulations is a strength as it ensures responsible business practices and minimizes legal and reputational risks.

- **Global market presence**

Many companies in this industry operate on a global scale and are majorly into exports, allowing for a broad customer base and diversified markets.

II. Weakness

- **Technological risk**

Reliance on advanced technologies can become a weakness if there are technological failures or difficulties in keeping up with rapid advancements.

- **Supply chain constraints**

The industry's reliance on a complex global supply chain makes it susceptible to disruptions, such as geopolitical events or natural disasters.

- **Dependence on raw materials**

Companies are vulnerable to fluctuations in the prices and availability of raw materials required for production.

- **Market volatility**

Economic downturns or changes in market demand adversely impact the industry's profitability and stability.

III. Opportunities

- **Emerging markets**

There are opportunities for expansion and growth in emerging markets where demand for fluorochemicals and specialty gas is growing.

- **Diversification of product portfolio**

Companies in this industry can explore diversification of their product offerings to meet the evolving needs of customers and expand their market share.

- **Green technologies**

The industry can explore opportunities in developing environmentally friendly or green technologies to address increasing concerns about sustainability.

- **Strategic partnerships**

Collaborations and partnerships with other industries or research institutions can foster innovation and open new avenues for growth.

IV. Threat

- **Regulatory changes**

When companies are not able to adapt quickly to changes in environmental or safety regulations, it can pose as a threat.

- **Competitive pressure**

Intense competition within the industry may lead to price wars and reduced profit margins.

- **Substitute products**

The development of alternative products or technologies could pose a threat to traditional fluorochemicals and specialty gases.

- **Geopolitical risks**

Political instability or trade disputes can disrupt the global supply chain and impact the industry's operations.

Companies can analyse all of the above and leverage strengths, address weaknesses, capitalize on opportunities, and mitigate threats.

3.9 Outlook

The Indian chemical industry has witnessed steady growth in the past decade and the potential for future growth continues to remain healthy. In the Indian chemicals and petrochemicals sector, an investment of Rs.8 lakh crore is estimated by 2025. The upward momentum in demand for inorganic and organic chemicals is estimated to continue to remain healthy backed by low per capita consumption of chemicals (including agrochemicals), rising demand for specialty chemicals, expected growth in downstream sectors like colours, paints, pigments, coatings, pharma, textiles, and personal care, and the thriving diversified manufacturing base.

In coming years, India is expected to grow as both, a manufacturing capital for valued goods and a consumer-driven economy. The industry is likely to benefit from the improvement in investment climate, speedy approval of projects, and

proposed reform measures that would translate into higher industrial activity, and in turn, generate higher demand for chemicals. Additionally, the increasing research & development (R&D) investments will contribute to the inorganic chemicals market growth in the near-to-medium term.

Furthermore, the fluorochemicals and specialty gas market demand in India will be stable and driven by rapid industrialization and growing population. Automotive segment demand is also expected to grow at a healthy pace and it is a leading segment where fluorochemicals are used. The increasing use of aluminium in the automotive segment is expected to drive the demand for fluorochemicals.

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About:

CareEdge is a knowledge-based analytical group that aims to provide superior insights based on technology, data analytics and detailed research. CARE Ratings Ltd, the parent company in the group, is one of the leading credit rating agencies in India. Established in 1993, it has a credible track record of rating companies across multiple sectors and has played a pivotal role in developing the corporate debt market in India.

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